

## Remarks

In the Office Action dated May 28, 2009, the abstract of the disclosure was objected to. Applicants hereby submit the abstract on a separate sheet (Sheet 3 here) as required by 37 CFR 1.72(b).

In the same Office Action, the omission of headings was objected to. Applicants hereby amend the specification to include the headings.

In the same Office Action, the omission of a Brief Description of the Drawing was objected to. Applicants hereby amend the specification to include the Brief Description of the Drawing.

In the same Office Action, claims 1-7 were pending. Claims 1-7 were rejected. Claims 5 and 7 were objected to. Claims 2 and 4-7 were rejected under 35 U.S.C. 112. Claims 1-2 are rejected under 35 U.S.C. 103(a). Claims 1-2, 4 and 6 are rejected under 35 U.S.C. 103(a). Claims 3 and 5 are rejected under 35 U.S.C. 103(a). Claim 7 is rejected under 35 U.S.C. 103(a). Claims 1, 3-5 and 7 are amended herein. Claim 2 is cancelled. No new matter has been added by these amendments. Reconsideration of the claims is respectfully requested in view of the following remarks.

## Claim Objections

The Examiner objected to claims 5 and 7. Claim 5 was objected to because a forward slash was missing between "and" and "or". Claim 5 now contains a "/" between "and" and "or". Claim 7 was objected to because of an extra recitation of "a". The extra recitation of "a" is now deleted from Claim 7.

## Rejections Under 35 U.S.C. §112, Second Paragraph – *Indefiniteness*

The Examiner rejected claims 2 and 4-7 as being indefinite. The Examiner rejected claim 2 as being indefinite because in its recitation it is unclear whether of "the means" refers to the first means or the second means recited in claim 1. Applicants have cancelled claim 2. The Examiner rejected claim 4 because antecedent basis for "the first enzyme" and "the second enzyme" was found to be lacking in claim 1. Claim 4 has been amended to depend from claim 3, as suggested by the Examiner. The Examiner rejected claim 5 because antecedent basis for "the L-phosphoinothricin" is lacking in claim 1. Claim 5 has been amended to depend from claim 3, as

suggested by the Examiner. Applicants believe these amendments overcome the Examiner's rejection, and respectfully request that this rejection be withdrawn.

**Rejections Under 35 U.S.C. §103(a)**

The Examiner rejected claim 1-2 as being unpatentable over Fabijanski et al (US 5,356,799) in view of Barry et al (US 5,463, 175). The Examiner further rejected claim 1-2, 4 and 6 as being unpatentable over Quandt et al (US 6,384,304) in view of McCabe et al (1999, *Theoretical and Applied Genetics* 99; 587-592). Claims 3 and 5 are rejected as being unpatentable over Fabijanski et al (US 5,356,799) in view of Barry et al (US 5,463, 175), and in further view of Bartsch et al (US 6,555,733). Claim 7 is rejected as being unpatentable over Quandt et al (US 6,384,304) in view of McCabe et al (1999, *Theoretical and Applied Genetics* 99; 587-592 ) as applied to claims 1-2,4 and 6, and further in view of Williams et al (US 5,977,433). The undersigned respectfully requests reconsideration in view of the following remarks.

When determining whether a claim is obvious, an examiner must make "a searching comparison of the claimed invention – *including all of its limitations* – with the teaching of the prior art." *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis added). Thus, "obviousness requires a suggestion of all limitations in a claim." *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (citing *In re Royka*, 490 F.2d 981, 985 (CCPA 1974)).

*Claims 1 and 2 over Fabijanski in view of Barry*

Specifically with respect to claim 1, Fabijanski provides a method for producing male sterility in plants and increasing the production of hybrid seeds from male sterile plants by transforming the plant with an antisense RNA encoding sequence that is linked to the gene that confers resistance to a selective agent. Barry provides genes useful in producing transformed plants which are tolerant to glyphosate herbicide. According to the examiner combining the teachings of Fabijanski and Barry would seem obvious to obtain a male sterile plant where the selective agent is an herbicide. However, applicants respectfully submit that the two combined together do not provide the desired solution disclosed by the applicants.

Fabijanski teaches a method of producing a genetically transformed male sterile plant by inserting into the genome a gene that confers herbicide resistance and a complimentary antisense

RNA encoding sequence under the control of a pollen-specific promoter (refer to Claim 1 of Fabijanski).

Barry teaches a recombinant DNA molecule comprising a DNA sequence that encodes a glyphosate oxidoreductase enzyme, the expression of which in a plant enhances the glyphosate resistance of the transformed plant.

In contrast, the applicant's invention, as recited in claim 1, is:

1. A method of producing male sterile plants comprising  
    providing an **enzyme for inactivating** a herbicide and  
    an **enzyme for reactivating** the thus inactivated herbicide, wherein  
    the herbicide inactivating enzyme is provided within vegetative tissues and the  
    reactivating enzyme is provided in male reproductive structures of the plant, so  
    that the vegetative, but not reproductive, structures are protected from the  
    phytotoxic activity of the herbicide when applied to the plant.

Specifically, neither Fabijanski nor Barry, alone or in combination, supply the claimed limitation of ***an enzyme for reactivating the thus inactivated herbicide*** as the means for obtaining male sterility. The means of obtaining male sterility taught by Fabijanski is the antisense DNA complimentary to sense DNA conferring herbicide tolerance. Further, for this invention to work, the antisense DNA is preferably placed under the control of the same promoter as found in the sense gene or expressed approximately the same time as the sense gene (refer to Fabijanski, column 4, lines 47-61). Applicants disclose in Claim 1 the means of obtaining male sterility is a reactivating enzyme, which functions subsequent to the inactivation event.

Barry achieves herbicide tolerance by inactivation of herbicide, glyphosate by the enzyme glyphosate oxidoreductase. Glyphosate oxidoreductase converts glyphosate to aminomethylphosphonate and glyoxylate (refer to Barry, Column 2, lines 15-19). Therefore, if the teachings of Fabijanski and Barry were combined, as suggested by the Examiner, the combination would not be able to provide a solution where the inactivation of the herbicide could be reversed (by reactivating the inactivated herbicide) to obtain male sterility. The inactivating means provided by Barry does not lend itself to be combined to the teachings of Fabijanski to obtain male sterility.

*Claims 1, 2 and 4 over Quandt in view of McCabe*

The Examiner rejected Claim 1 as being unpatentable over Quandt in view of McCabe.

Quandt provides the use of a deacytlyase coding sequence for obtaining conditional sterility and McCabe provides a stable means of herbicide resistance up to the third seed generation.

The method taught by Quandt for obtaining conditional sterility is the exact problem in the prior art sought to be overcome by the applicant's invention (refer to applicant's full specification page 3, lines 8-31).

McCabe, however, provides phosphinothricin acetyl transferase (PAT) under the control of a plastocyanin promoter as a means of herbicide tolerance. The primary teaching here is the superiority of petE promoter over 35s promoter in generating stable inheritance (refer to McCabe Abstract). PAT is used here merely as a means of obtaining herbicide tolerance as an agronomically advantageous trait expressed by a transgene to compare the efficiency of petE promoter and 35s promoter in generating stable inheritance.

There is no motivation in either reference to be combined with the other to A) provide PAT and deacetylase/hydrolase enzymes and B) to treat the plant with phosphinothricin as means of conditional sterility in plants. In fact, Quandt teaches away from the use of herbicides as a means of hybridization (refer to Quandt Column 2, lines 47-63) by producing male sterile plants by the activity of herbicide as recited in the applicant's claim. This would discourage a person of ordinary skill in the art from exploring the path of using applications of herbicides as a means of achieving conditional sterility in plants.

Further, combining teachings of McCabe to those of Quandt for deriving the advantage of conferring the highest level of herbicide resistance to those plant parts which are to be retained, as suggested by the examiner, are insufficiently described for the working of the solution provided by the applicant. On page 5, lines 16-19, applicants illustrate the insufficiency of the teachings of McCabe : 'in the hybrid crop, this co-expression of the inactivating enzyme in the floral tissue counterbalances the effect of the activating enzyme and therefore prevents loss of yield upon application of herbicide'.

Furthermore, dependent claims 2-7 depend either directly or indirectly, from claim 1 and recite additional features thereof. As such and for the exact same reasons set forth above, the

applicants submit that none of these claims is obvious with respect to the teachings of Fabijanski and Barry, or McCabe and Quandt.

Bartsch alone or in combination with other references fails to supply any of the above noted deficiency(ies) of the applied references. Additionally, Williams, alone or in combination with other references also fails to supply the above noted deficiency(ies) of the applied references. Therefore, Applicants submit that all these dependent claims fully satisfy the requirements of 35 U.S.C. § 103 and are therefore patentable.

### **Conclusions**

Applicants respectfully submit that all outstanding issues in the present case have been addressed in this paper. The Examiner is invited and encouraged to call the undersigned attorney for Applicants at 919-765-5117 in the event that issues remain unresolved by this response and could be discussed via telephone for clarification.

Respectfully submitted,



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Date: August 14, 2009